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ABSTRACT

This paper describes the rationale for investigating the comfort levels in utilizing computer technology by senior level students in a baccalaureate nursing program. Students were surveyed before and after being exposed to various learning activities requiring interaction with computer technology. These structured learning activities included: use of original faculty-developed multimedia presentations for the delivery of lecture material; group projects that required accessing and reading faculty developed case studies files that had been downloaded to the satellite computers; communicating class assignments, clarification of instructions, tutorial help, grades, and other information via e-mail; and computer-assisted instruction and interactive video software as tutorial aids. Results demonstrated increased comfort after the implementation of structured learning activities throughout the semester. Implications for other student groups can be drawn from these results. (Contains 11 references.) (Author/AEF)

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Senior Nursing Students Comfort Levels with Computer Technology

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Abstract:

This presentation will describe the rationale for investigating the comfort levels in utilizing computer technology by senior level students in a baccalaureate nursing program. Students were surveyed before and after being exposed to various learning activities requiring interaction with computer technology. Results demonstrated increased comfort after the implementation of structured learning activities throughout the semester. Implications for other student groups can be drawn from these results.

Key words: computer technology, computer competency, comfort

Senior Nursing Students Comfort Levels with Computer Technology

Introduction:

The nursing student of today is often caught in limbo concerning computer technology. Having gone through elementary and secondary schools before the widespread availability of microcomputers but entering a field where a comfort level in the use of computer technology is expected, students may feel ill-prepared upon graduation. According to Vanderbeek and Beery (1998), " A foundation must be laid in basic nursing education that will equip today's new graduates with the knowledge and skills necessary to function effectively in a world increasingly dominated by electronic systems. Today's nurses must be able to participate in a discussion of standardized vocabulary, atomic data, and classification systems. They must be able to link assessment data with outcomes and benefit from the projects of others."

There is little consistency in the requirements that faculty have of students as to the use of instructional technology, in learning activities that use computers or even in computer systems in use at various schools and clinical facilities. Students are often left to "fend for themselves" to learn how to use the required technology.

Rather than be just passive participants in technology, nurses of the future will need to take leadership

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roles in how computer technology is applied in nursing. As such, comfort in using technology should be an expected graduate competency. This pilot study looked at the change in student experience and comfort levels following structured use of technology in classroom learning activities in a second semester senior nursing class.

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Review of Literature:

In reviewing available nursing literature on use of computer technology, topics included for example, the discussion of nursing and hospital information systems and how learning the use of those systems should be incorporated in the baccalaureate curriculum; how the use of e-mail incorporated into distance learning classes enhances communication with students; and how video conferencing can be used to teach specify areas of content.

Poirrier, et. al. (1996) described the development of curricular applications for nursing information systems. This article provided support for the need for nursing to be "on the cutting edge" of information technology. The authors described the need for nursing program graduates to not only be computer literate, but to possess a sophisticated degree of computer competent in order to effectively work in today's health care environment.

Anderson (1995) described the integration of e-mail technology into a community health course and identified advantages such as increased student participation, facilitation of communication, easier dissemination of information, the development of a feeling of community within physically separated students, the development of greater computer literacy and the student's greater access to the faculty member. Inequality of initial computer literacy, increase time requirements, and the decrease in face-to-face interaction were identified as disadvantages to the use of e-mail technology. These same advantages and disadvantages has been noted in other literature reviews.

Witucki, et. al. (1996) described their process of integrating e-mail conferencing to promote critical thinking in sophomore baccalaureate nursing students. Following a semester of using the technology, a majority of the students reported that the conferencing provided experiences with a wider variety of client or nursing care situations. The findings supported that the use of computer technology in this manner enhanced student - faculty and student - student communication.

Numerous reviewed articles described the competencies and requirements that graduate nurses need to effectively practice their profession. The American Nurses Association (1994) published *The Scope of Practice for Nursing Competencies for Informatics* for graduates of basic nursing programs. These competencies included: (1) identify, collect, and record data relevant to the nursing care of patients; (2) analyze and interpret patient and nursing information as part of the planning for and provision of nursing services (3) employ health care informatics application designed for the clinical practice of nursing and; (4) implement public and institutional policies related to privacy, confidentiality and security of information. These include patient care information, confidential employer information , and other information gained in the nurse's professional capacity. The Joint Commission on Accreditation of Health Care Organizations, in 1994, published standards for information management, supporting the idea that the management of information is as important as the management of any other resources available to health care organizations (Parker and Gassert, C. 1996). Hebda, Czar, and Mascara (1998) identified applications within nursing where computer technology is essential. Some examples include:

Nursing Practice

- Worklist to remind staff of planned nursing interventions
- Computer-generated client documentation
- Monitoring devices that record vital signs and other measurements directly into client record
- Computer-generated nursing care plans and critical pathways
- Automatic billing for supplies or procedures with nursing
- Reminders and prompts that appear during documentation to ensure comprehensive charting

Nursing Administration

- Automated staff scheduling
- Electronic mail for improved communication
- Cost analysis and finding trends for budget purposes
- Quality assurance and outcomes analysis

Nursing Education

- Computerized record-keeping
- Computer-assisted instruction
- Interactive video technology
- Distance learning in the form of teleconferencing
- Internet resources
- Presentation software for preparing slides and handouts

Nurse Research

- Computerized literature searching
- The adoption of standardized language related to nursing terms, NIC, NOC
- The ability to find trends in aggregate data, which is derived from large population groups

The Pew Health Professions Commission (1993) recognized the need for professional nurses to have competencies in assessing and using technology appropriately in addition to managing and using "large volumes of scientific, technological, and patient information". The American Association of Colleges of Nursing (AACN) in the policy statement "Essentials of Baccalaureate Education for Professional Nursing Practice" (1997), identified that technology utilization and being a broker of information are key elements of the professional nursing role. This includes data base management, the use of technology in clinical decision making and effective communication with health care consumers, peers and members of the interdisciplinary health care team. As the AACN envisioned the future of the health care delivery systems, they confirmed the need for nursing education programs to provide for the development of graduates with competencies in computer technology. (AACN, Position Statement, 1997).

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Methodology:

Data collection consisted of administering an instructor-made survey tool at the onset of the last senior semester. The questionnaire asked students to rate their experience with various computer uses (e-mail, computer assisted instruction programs, use of the Internet, data entry, and word processing) and their comfort levels in using technology for various learning activities (computers in general , word processing, e-mail, learning new applications, working alone or within groups on computer assignments, and computer conferencing as in distance learning). On the pretest, students were given the opportunity to offer comments on advantages they anticipated in using the computer and problems they anticipated they would encounter.

The course chosen for this pilot, a second semester senior nursing course, was taught utilizing "Master Classroom" technology. The Master classroom consists of a teacher station that contains a Pentium PC, an "Elmo" visual presenter, a VCR, a laser disc player and an audio receiver/player. This teacher computer is networked with six "satellite computers" located around the perimeter of the room. The teacher station is interfaced with a ceiling mounted projector that is capable of projecting from the multiple input sources.

Structured learning activities using computer technology were implemented throughout the semester. These included:

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1. Use of original faculty developed multimedia presentations for the delivery of lecture material. For example, in the area of "Nursing care of the Client with Acute Renal Failure" the multimedia presentation included text, graphics that reviewed renal anatomy and physiology, and video clips that depicted the processes involved in dialysis.
2. Group projects that required accessing and reading faculty developed case studies files that had been downloaded to the satellite computers. The case studies contained a client scenario, subjective and objective data and critical thinking questions. After studying the case, the groups collaboratively answered the questions and typed their answers into the file. The student information was then accessed via the teacher computer and projected to the screen for student lead discussion.
3. Communicating class assignments, clarification of instructions, tutorial help, grades, etc. via email
4. CAI's and Interactive Video software (required or encouraged) as tutorial aids.

On a post test given the last day of class, students were again requested to rate their experience and comfort levels with technology and were given the opportunity to comment on problems that they encountered with the technology and whether they saw advantages over traditional techniques.

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Data Analysis and Discussion:

The following results were seen when pre and post tests were compared. Experience levels increased in the majority of students. Experience with:

1. Email in the pretest showed the highest number in the "very little experience" choice with the highest level on the post test being in the "fair amount of experience" choice.
2. CAI's in the pretest showed the highest number in the "some experience" choice with the highest level on the post test being in the "fair amount of experience" choice.
3. Internet in the pretest showed the highest number in the "very little experience" choice; on the post test this remained the highest choice but with a decrease of the number from 23 answers to 12.
4. Data entry on the pretest showed the highest number in the "very little experience" choice with the highest level on the post test being in the "some and moderate amount of experience" choices.
5. Word processing on the pretest showed the highest number in the "fair amount of experience" choice with the highest level on the post test being in the " very experienced" choice.

Comfort levels with the use of computer technology also showed improvement from pre to post test. Comfort with:

1. Computers on the pretest showed the highest number in the "somewhat uncomfortable " choice with the highest level on the post test being in the "somewhat comfortable and the comfortable" choices.
2. Word processing on the pretest showed the highest number in the "somewhat comfortable " choice with the highest level on the post test being in the "very comfortable" choice.
3. Use of new applications on the pretest showed the highest number in the "very uncomfortable " choice with the highest level on the post test being in the "somewhat uncomfortable" choice.
4. Working alone on computers on the pretest showed the highest number in the "very uncomfortable " choice with the highest level on the post test being in the "somewhat comfortable" choice.
5. Working in groups with computer activities on the pretest showed the highest number in the "somewhat comfortable " choice with the highest level on the post test being in the "comfortable" choice.
6. Computer conferencing on the pretest showed the highest number in the "very uncomfortable " choice with the highest level on the post test being in the "somewhat comfortable" choice.

The results of data analysis are depicted graphically on the following graphs.

Table 1: Computer Experience

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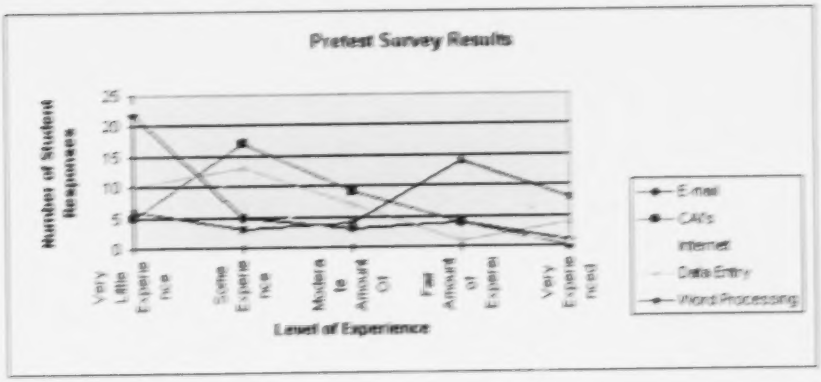
Pretest: n=35



Post-test: n=35

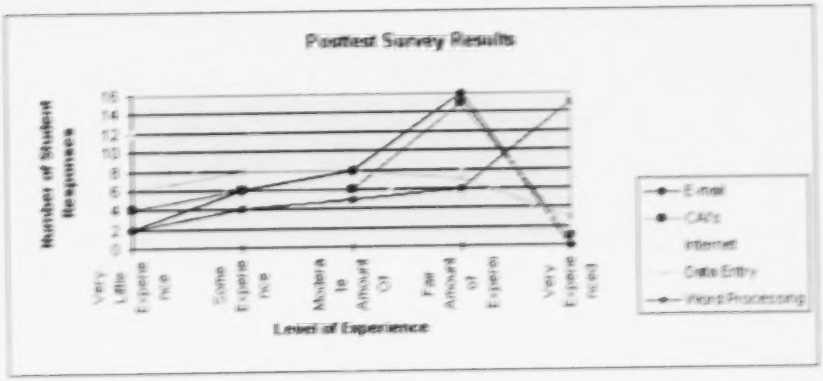
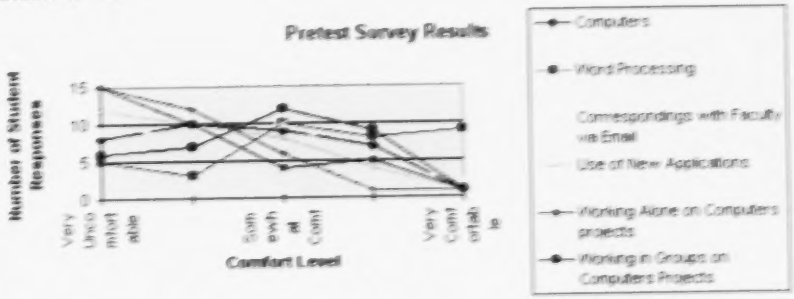


Table 2: Comfort Levels

Pretest: n=35



Post-test: n=35

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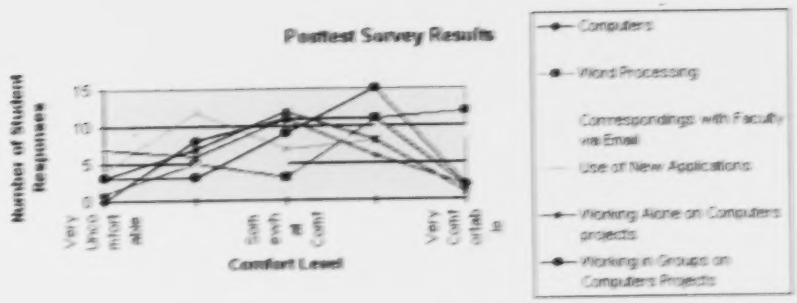

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Summary:

The results of this pilot project indicated that structured learning activities integrated into a senior level nursing course increased the student's experience and comfort levels with the use of computer technology. Students offered comments such as : "the multimedia presentations were stimulating, colorful, clearer, helpful"; "E-mail as a means of communication was great, more interactive, helped me to get started with technology", "it felt good learning to use the computer".

Although the sample size was small and generalization is limited, this pilot documented the variety of computer skills that students bring to class; the large number that still come with very limited exposure; and that integrating technological learning activities can be a successful method for achieving the objective of computer competency upon graduation. Based on the results, additional learning activities have been integrated into the classes. These included web-based learning activities, increase use of e-mail communications, and further accessing information via internet sources. Further investigation of this topic is planned to note changes (1) from admission to the nursing curriculum to graduation, (2) with the addition of a greater variety of structured computer learning activities, and (3) with repeated exposure to computer technology over multiple semesters.

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